

Amendments to the Claims:

1-31 (canceled)

32. (currently amended) A method of making a transgenic non-human mammal comprising:

introducing into at least one non-human mammalian zygote at least one recombinase and at least two single-stranded targeting polynucleotides which are substantially complementary to each other to produce a modified zygote comprising a modified endogenous nucleic acid; and implanting said modified zygote into a non-human female mammal to produce a transgenic non-human mammal by fostered gestation.

33. (previously presented) The method of claim 32, wherein each of said at least two single-stranded targeting polynucleotides further comprise a homology clamp that substantially corresponds to or is substantially complementary to a preselected target DNA sequence in said zygote.

34. (previously presented) The method of claim 32, wherein said non-human mammal is a selected from the group consisting of cattle, sheep, pigs, horses and goats.

35. (canceled)

36. (previously presented) The method of claim 32, wherein said non-human mammal is selected from the group consisting of mice, rats, rabbits, guinea pigs, hamsters and gerbils.

37. (previously presented) The method of claim 33, wherein the preselected target DNA sequence is selected from the group consisting of a gene or sequence encoding an ion-channel protein, a G-protein coupled receptor (GPCR), an immunoglobulin, a growth factor, an enzyme, or a milk protein.

38-40. (canceled)

41. (previously presented) The method of claim 32, wherein the modification of said endogenous nucleic acid is a deletion of at least one nucleotide in said endogenous nucleic acid

as compared to a nucleic acid with the same sequence in a cell or mammal of the species from which the transgenic non-human mammal is derived.

42. (previously presented) The method of claim 32, wherein the modification is a disruption by an insertion sequence in said endogenous nucleic acid as compared to a nucleic acid with the same sequence in a cell or mammal of the species from which the transgenic non-human mammal is derived.

43. (previously presented) The method of claim 42, wherein said insertion sequence is a polylinker sequence.

44. (previously presented) The method of claim 42, wherein said insertion sequence is a reporter gene.

45. (previously presented) The method of claim 44, wherein said reporter gene is selected from the group consisting of a luciferase gene, a β -galactosidase gene and green fluorescent protein (GFP), blue fluorescent protein (BFP), red fluorescent protein (RFP) and yellow fluorescent protein (YFP).

46. (previously presented) The method of claim 42, wherein said insertion sequence is selected from the group consisting of a gene encoding human lysozyme, human growth hormone, human serum albumin, human globin, a human immunoglobulin, and a human enzyme.

47. (previously presented) The method of claim 46, wherein said human enzyme is α -1 antitrypsin.

48. (previously presented) The method of claim 46, wherein said human enzyme is antithrombin III.

49. (previously presented) The method of claim 46, wherein said human enzyme gene does not encode any phenylalanine residues.

50. (previously presented) The method of claim 42, wherein said insertion sequence is selected from the group consisting of a human gene under control of its endogenous promoter, a

modified endogenous regulatory element for an endogenous gene, a transcriptional regulation cassette and a dimerizing sequence.

51. (previously presented) The method of claim 50, wherein said endogenous regulatory element is disrupted by deletion of at least one nucleotide.

52. (previously presented) The method of claim 50, wherein said regulatory element is disrupted by an insertion sequence.

53. (previously presented) The method of claim 37, wherein said enzyme is a sugar transferase enzyme.

54. (previously presented) The method of claim 53, wherein said sugar transferase enzyme is a-galactosyl transferase.

55. (previously presented) The method of claim 54, wherein said α -galactosyl transferase gene is disrupted by deletion of at least one nucleotide.

56. (previously presented) The method of claim 54, wherein said α -galactosyl transferase gene is disrupted by an insertion sequence.

57. (previously presented) The method of claim 56, wherein said insertion sequence is a hormone receptor gene.

58. (previously presented) The method of claim 56, wherein said insertion sequence is a viral receptor gene.

59. (previously presented) The method of claim 56, wherein said insertion sequence is a G-protein coupled receptor gene.

60. (previously presented) The method of claim 32, wherein the modification in said endogenous nucleic acid is selected from the group consisting of the substitution of at least one nucleotide as compared to a nucleic acid with the same sequence in a wild-type cell or mammal of the species from which the transgenic non-human mammal is derived, an insertion of a

polylinker sequence, and a deletion of at least one nucleotide as compared to a nucleic acid with the same sequence in a wild-type cell or mammal of the species from which the transgenic non-human mammal is derived.

61. (previously presented) The method of claim 60, wherein said endogenous nucleic acid is disrupted by deletion of at least one nucleotide as compared to a nucleic acid with the same sequence in a wild-type cell or mammal of the species from which the transgenic non-human mammal is derived.

62. (previously presented) The method of claim 60, wherein said endogenous nucleic acid is disrupted by an insertion comprising a polylinker sequence.

63. (currently amended) The method of claim 32, wherein said non-human female mammal produces at least one non-human mammal that expresses a modified protein encoded by said modified endogenous nucleic acid.

64. (previously presented) The method of claim 32, wherein said mammalian zygote is not from mouse.

65. (previously presented) The method of claim 34, wherein said endogenous nucleic acid is selected from the group consisting of a gene or sequence encoding an ion-channel protein, a G-protein coupled receptor (GPCR), an immunoglobulin, a growth factor, an enzyme, or a milk protein, and wherein said disruption comprises the deletion of at least one nucleotide as compared to the same gene or sequence in a wild-type cell or mammal of the species from which the transgenic mammal is derived.

66. (previously presented) The method of claim 35, wherein said endogenous nucleic acid is selected from the group consisting of a gene or sequence encoding an ion-channel protein, a G-protein coupled receptor (GPCR), an immunoglobulin, a growth factor, an enzyme, or a milk protein, and wherein said disruption comprises the insertion of a polylinker sequence as compared to the same gene or sequence in a wild-type cell or mammal of the species from which the transgenic mammal is derived.

67. (previously presented) The method of claim 66, wherein said mammal is a goat.
68. (previously presented) The method of claim 66, wherein said farm mammal is a pig.
69. (previously presented) The method of claim 66, wherein said mammal is a cow.
70. (previously presented) The method of claim 68, wherein said endogenous nucleic acid is an α -galactosyl transferase gene.
71. (canceled)